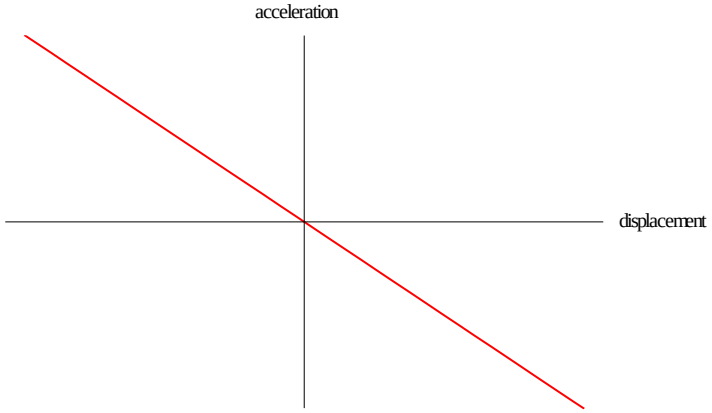
Quiz C12.1

Simple harmonic motion

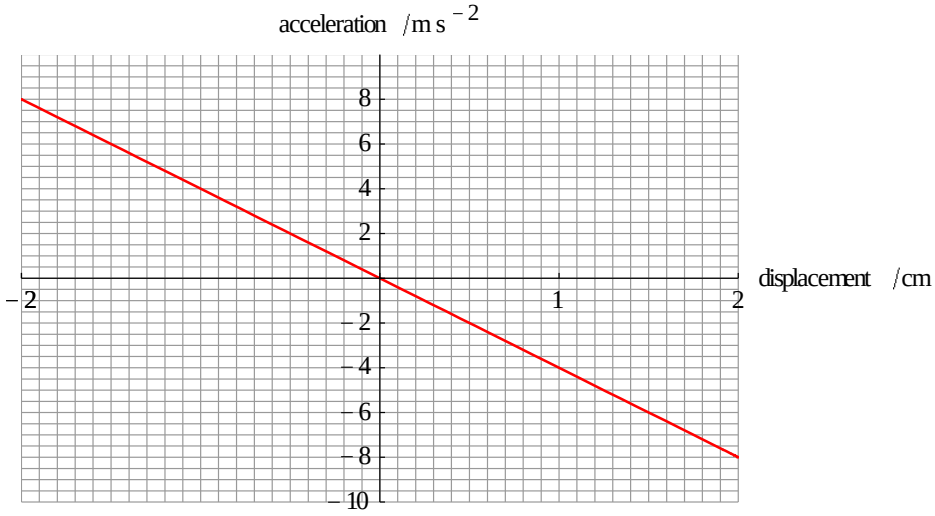
1. The graph shows the variation of acceleration with displacement.



It may be deduced that simple harmonic oscillations take place because the graph

A is a straight line.
B goes through the origin.
C goes through the origin and is a straight line.
D goes through the origin and is a straight line with negative gradient.

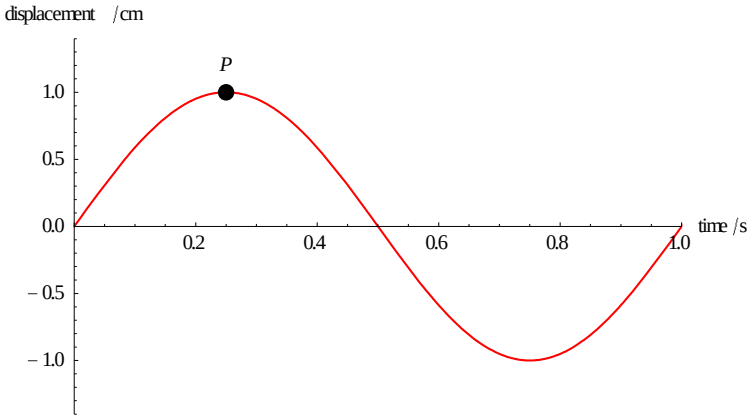
2. The graph shows the variation of acceleration with displacement for a particle performing simple harmonic oscillations.



What is the period of oscillations in seconds?

A $\frac{\pi}{20}$ **B** $\frac{\pi}{10}$ **C** $\frac{\pi}{2}$ **D** π

3. The graph shows the variation with time of the displacement of a particle performing simple harmonic oscillations.



What is correct about the magnitude of the velocity and of the acceleration of point P?

	Velocity	Acceleration
A	Maximum	Maximum
B	Maximum	Zero
C	Zero	Maximum
D	Zero	Zero

4. The period of simple harmonic oscillations is T. What is the period of oscillations when the amplitude is halved?

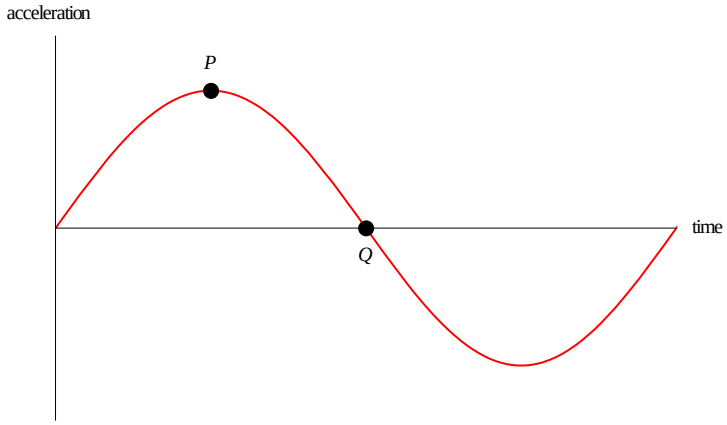
A $\frac{T}{4}$

B $\frac{T}{2}$

C T

D $2T$

5. The graph shows the variation with time of the acceleration of a particle performing simple harmonic oscillations.



What is correct at points P and Q?

	P	Q
A	Kinetic energy is a maximum	Potential energy is a minimum
B	Kinetic energy is a maximum	Potential energy is a maximum
C	Kinetic energy is a minimum	Potential energy is a minimum
D	Kinetic energy is a minimum	Potential energy is a maximum

6. A pendulum has period T. The length and the mass of the bob of the pendulum are both doubled. What is the new period?

A $\frac{T}{2}$

B $\frac{T}{\sqrt{2}}$

C $T\sqrt{2}$

D $2T$

7. The acceleration of free fall on a planet is 4 times as large as that on Earth. A mass spring system has period T on Earth. What is the period on the planet?

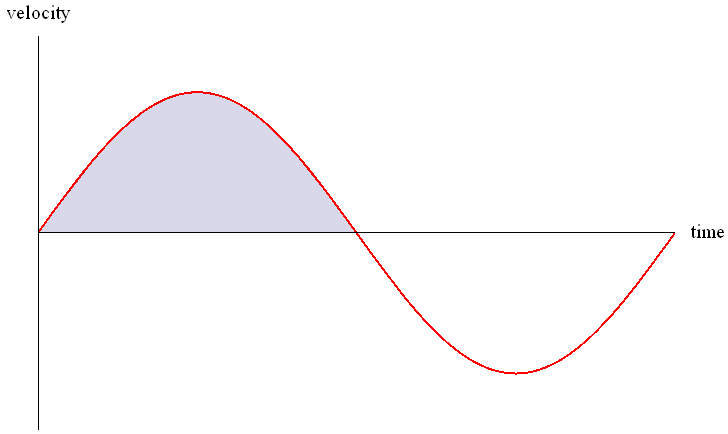
A $\frac{T}{2}$

B T

C $T\sqrt{2}$

D $2T$

8. The graph shows the variation with time of the velocity of a particle performing simple harmonic oscillations. The amplitude of the motion is P.



What does the shaded area represent?

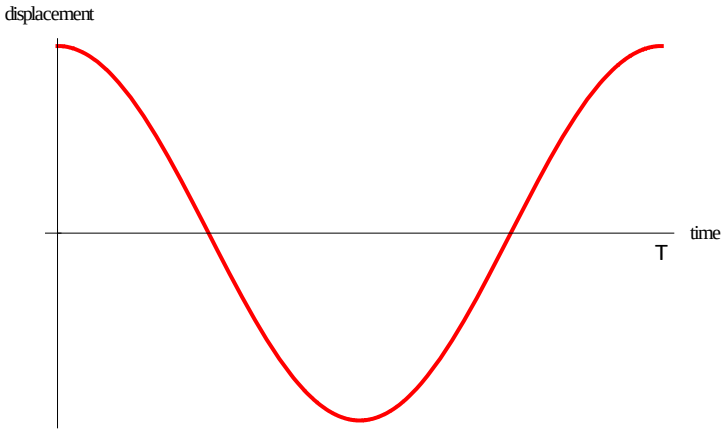
A $4P$

B $2P$

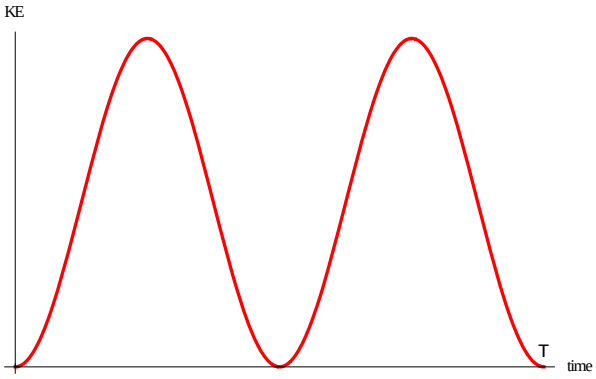
C P

D $\frac{P}{2}$

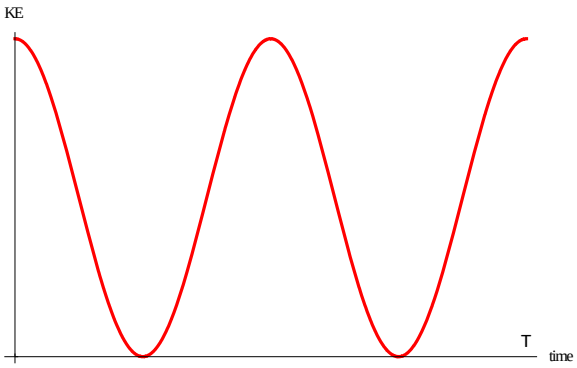
9. The graph shows the variation with time of the displacement of a particle performing simple harmonic oscillations with period *T*.



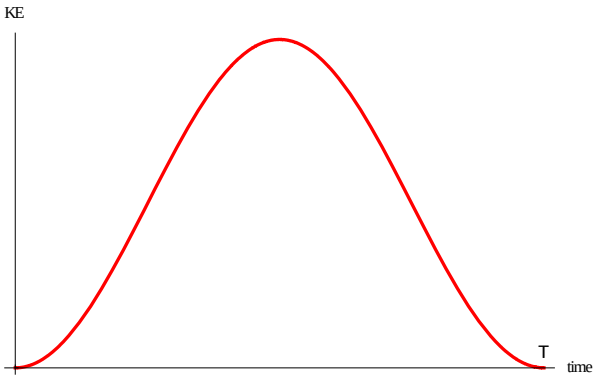
Which graph shows the variation with time of the kinetic energy of the particle?



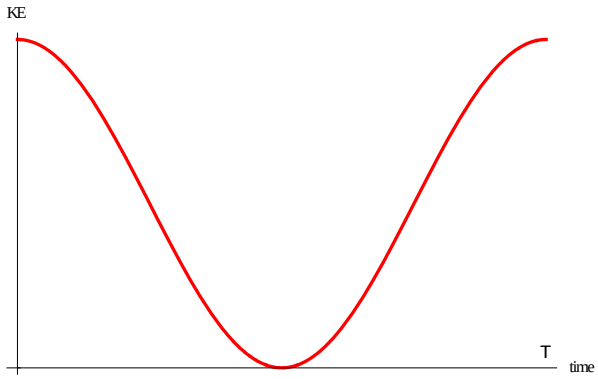
A



B

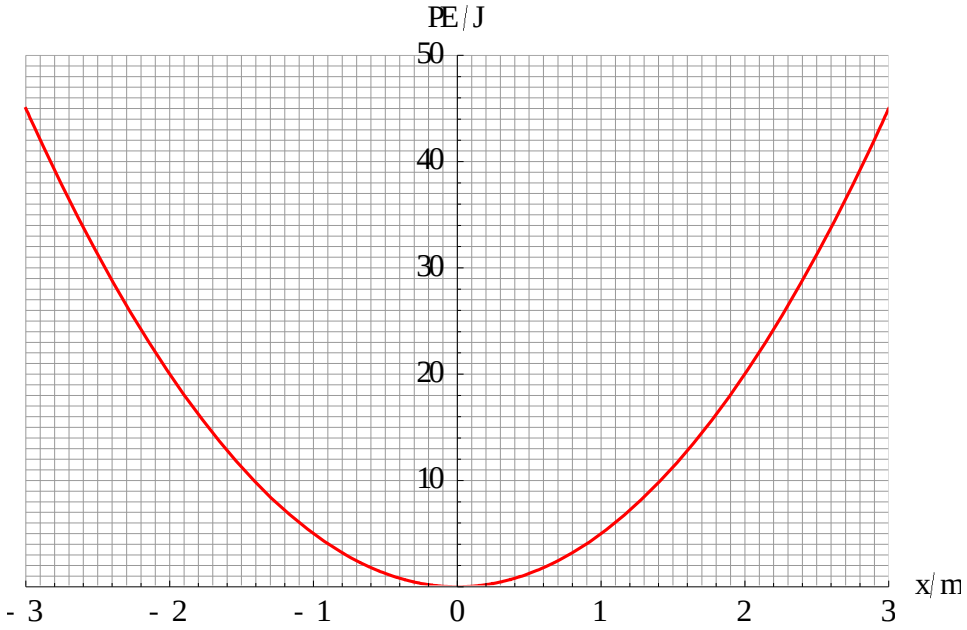


C



D

10. The graph shows the variation with displacement *x* of the potential energy of a particle of mass 2.0 kg performing simple harmonic oscillations.



What is the speed of the particle when the displacement is 2.0 m?

A $\frac{5.0}{\sqrt{2}}\ \text{m s}^{-1}$ **B** $2\sqrt{5.0}\ \text{m s}^{-1}$ **C** $\sqrt{5.0}\ \text{m s}^{-1}$ **D** $5.0\ \text{m s}^{-1}$

Quiz C12.1 Answers	
1	D
2	B
3	C
4	C
5	C
6	C
7	B
8	B
9	A
10	D